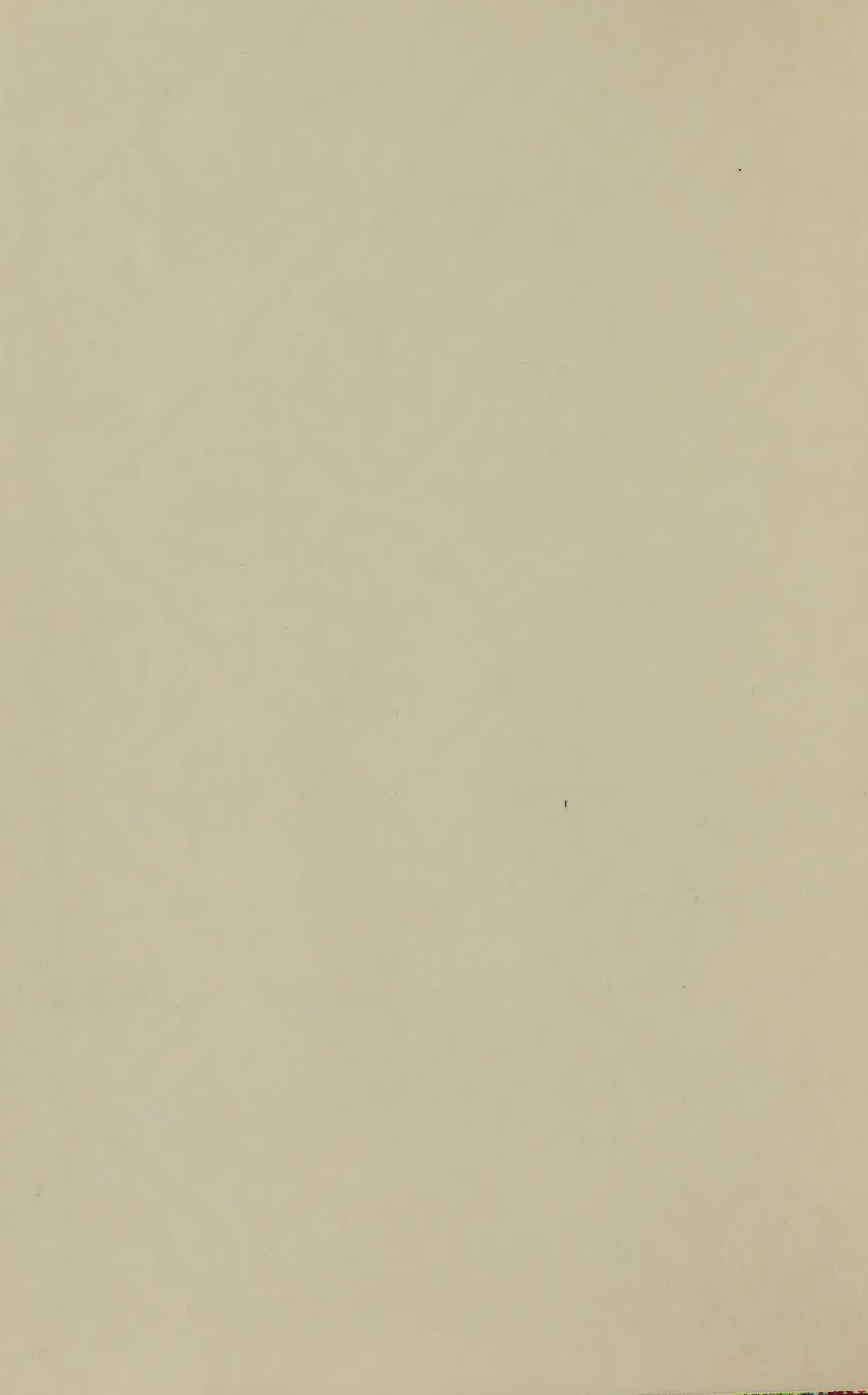


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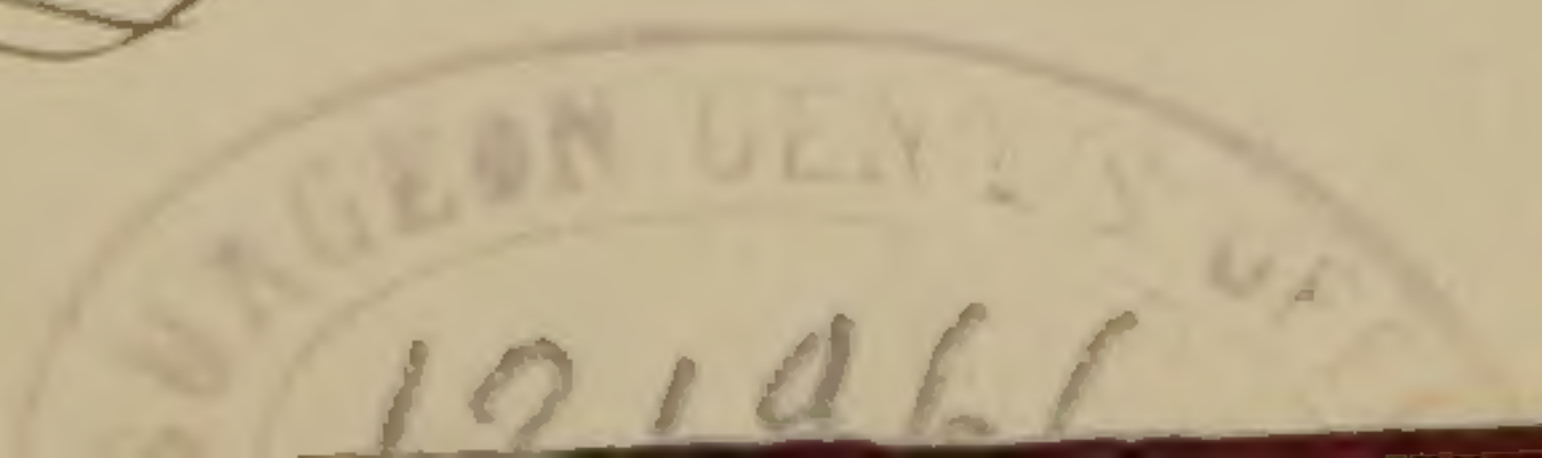
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S. G.

My dear Dr. Billings:

The editor of the "Medical News" has
had my petroleum paper a long time
on hand - but it is now out & I have the
pleasure of sending you the reprint &
some not very good photographs
of the patient whose case is described
in full. They show the skin-lesions
well, but were by the photographer's
carelessness, quite out of focus.
With thanks for your assistance
with references, I am,

Yours very truly
John Kearsley Mitchell



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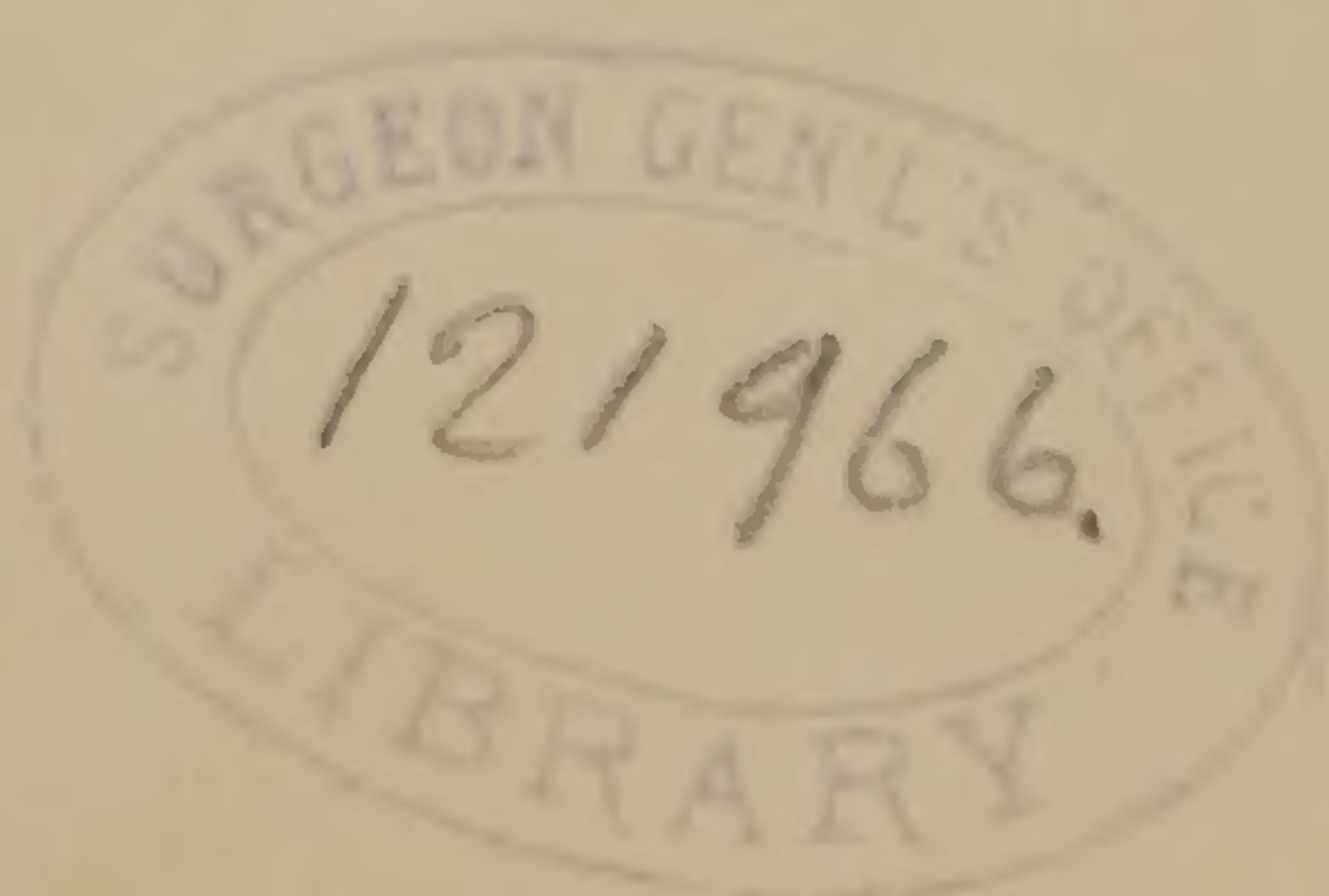
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[Reprinted from THE MEDICAL NEWS, August 11, 1888.]

THE GENERAL AND LOCAL EFFECTS OF PARAFFIN OIL UPON THOSE WORKING IN IT.

BY JOHN K. MITCHELL, M.D.,
ATTENDING PHYSICIAN TO ST. MARY'S HOSPITAL, PHILADELPHIA.

THE diseases incident to various trades and occupations have not received a great share of the attention of physicians, with the exception of certain neuroses, which have been very thoroughly studied. My own notice was first called to the subject of this paper when serving as resident physician to the Episcopal Hospital of this city, some five years ago. In the dispensary at that time I had the opportunity of seeing several cases of eruptions caused by kerosene, or the oils refined from it. Unfortunately, I was ignorant of their interest and novelty, and in the hurry of a very crowded service kept no note of them beyond the mere diagnosis in the dispensary book. My recollection is that none of them was so bad as the cases which I have recently studied at the works of the Atlantic Oil Refinery. I noted them merely as "general furunculosis," and they were treated, as skin diseases are apt to be in general out-service, with arsenic, and by directions to the patient to "wash." They did fairly well, and slowly recovered. Afterward, when house physician, I



saw a large number of cases, in the charge of Dr. Morris J. Lewis, of a trouble which we believed to be caused by the handling, by unaccustomed men, of refined kerosine oil.

The subjects were all sailors, engaged in the loading of oil in barrels on ships lying at Point Breeze. The men were seized, always suddenly, and always after some days of the labor, with cramp-like pains in the stomach and intestines, together with severe constricting pain about the lower part of the chest, with obstinate, slight diarrhoea, with nausea and, occasionally, with some vomiting. After attempting to trace the disease to the influence of the river water, and excluding that, and finding that they were lodged much as usual in their hard-working calling, and living in an accustomed way, with the exception that, owing to the harbor rules against lights on board vessels loading oil, they were obliged to eat, for the most part, cold food. But this is by no means unusual at sea, and we were finally forced to agree with the men, who themselves attributed their difficulties to the vapors from the oil. The cases yielded to simple treatment.

Within the last few weeks the subject of skin trouble from oil was again suggested to me by a talk with Mr. Livingston, Superintendent of the Atlantic Oil Refinery at Point Breeze. The first case which I saw from this cause has already been shown at the College of Physicians.

My notes of this man's history and condition are like those of all the others I have seen, differing

only in degree. I will give them in full, commenting afterward on the causes and peculiarities.

J. J., aged thirty-nine years, German. A middle-sized, strongly made man, with a good family and personal history. He has worked three years in the paraffin department of the oil refinery, at first out of doors, handling the products, but not much in direct contact with them. During the second year he had a slight eruption of comedones and boils, which soon disappeared. In the autumn of 1887, he was put at work inside the press-rooms. In October, he had some boils on his arms; soon after, they broke out on his legs; for a time they varied in severity, but in January and February of the present year, they became so painful and troublesome that he stopped his work on March 6th.

On March 8th, I made a careful examination. The appearance of the man's face was not peculiar except that there were two or three parallel rows of largish comedones upon his forehead. On stripping him and examining his trunk, similar comedones were found distributed over his shoulders, chest, belly, arms and legs, together with numerous rounded, elevated, angry swellings on a red, inflamed base, varying in size from a small pimple one-eighth of an inch in diameter to a huge boil at the point of suppuration, and two or two and one-half inches across. Some of them were simply red swellings, others presented evidence of containing pus. The arm, from about two inches above the elbow anteriorly to the wrist, was almost covered with them, and both the anterior and posterior surfaces of the thighs, from above their middle to the knee, showed scarcely a square inch of healthy skin. Below the tubercle of the tibia the legs showed nothing wrong.

A closer study of the surface with a magnifying glass showed that the smaller swellings bore a hair about the middle of them, and this usually sprang out of or just along side of the central black spot of the comedo. It was evident, both here and in the other cases, that the comedo was the original lesion. The distribution of these was extraordinary; not only were they seated on the face, in the interscapular space and upon the chest, in all which situations they may be commonly found in persons who suffer from this form of skin trouble, but their presence was universal. Rows of them ran across the belly, particularly just above the umbilicus and around the waist; they were even crowded together on the backs of the hands. The recent ones were like ordinary comedones, simple black spots. The next stage showed these spots a little larger and behind them tiny swellings under the skin; in the third stage the spots were distinctly depressed a little, or perhaps it would be more accurate to say that the edges of the skin surrounding them were well elevated and slightly red. They then continued to swell and grow more inflamed, until the inflammation had pushed up the whole swelling, and in place of the comedo there was a round red tumor, the color shading off into the normal about it. The swelling itself was hard, the tissue around thickened and dense, and the inflammation seemed to extend deeply. Apparently some of these remained in this state; others grew larger and larger, or several ran together until their size was, as I have said, in some instances, more than two inches in diameter. A close examination showed upon the surface of all of them one or more of the black spots about which the inflammation had begun. The whole of the front of the left thigh was occupied by five or six

such tumors. The formation of pus in them appeared slow, for, on incising one of half an inch across, a single drop of pus was all that it contained, quite deep down. The microscope revealed no unusual character in this pus, except that much sebaceous matter was mixed with it. A comedo removed entire by careful picking out with a needle, was found, with a powerful glass, to present only the ordinary appearance of such cysts, except that the dark-colored matter which forms the top seemed to line completely the little oval sac on all sides, as though secretion of it had taken place from within. On cutting into it a microscopic study discovered nothing save sebaceous débris and this unorganized dark pigment. The result of numerous examinations of pus and the contents of these cysts was the same in every case, with one exception, which I shall mention later.

The patient stated that he had little pain, except that the swelling made his movements very stiff, and exertion stretched the skin so as to hurt him. The boils, he said, he opened himself when he thought they had "come to a head," and that, before they had become so numerous, this had relieved him greatly each time. His functions were in perfect order, and his appetite good. His skin had a very greasy feeling, although he had washed thoroughly just before coming to visit me. I may add here, that after the first baths which he took during his stay at the German Hospital, the surface of the water in the tub was noticed to be covered with floating oil.

I examined his blood, but found the corpuscles perfect in size and shape, and the hæmoglobin 59 per cent.

I am indebted to the kindness of Dr. George A. Bodamer for the following notes of the foregoing case, while under his charge in the German Hospital.

“During treatment in hospital new furuncles made their appearance and old ones relapsed, very often to the extent of formation of abscesses, which were opened and considerable pus eliminated. From this condition a rise of temperature occurred, seldom, however, above 102° , and ranging between this and normal. The soda baths seemed to give him great relief and cleanse away the fatty matters. After such a bath, to rub himself with a coarse towel, would dislodge, to a surprising extent, the comedones. The furuncles which relapsed and formed abscesses were mostly on the upper parts of the legs and arms. Another symptom of which he complained was intense pain at night, sometimes to an extent requiring morphia.”

I have since seen this patient, who has almost entirely recovered.

As I have said, this case presents the features of “paraffin eruption” in a typical manner. Before speaking of the variations which I found in the details of some other cases, I will describe briefly the process of paraffin making, in which all my patients were working. After several distillations for removing oil of different specific gravities from the crude petroleum, there remains a heavy tarry residuum, by a new distillation of which paraffin oils are distilled over, and pure carbon is left in the stills. The paraffin oil is treated in huge tanks, with sulphuric acid to destroy any organic matter which may be present, then with soda to neutralize

the acid, and then with pressure, hot in one, cold in another chamber, the latter kept artificially cooled by brine which has been chilled by an ammoniacal process. The men in the room in which cold pressure is applied to the paraffin wax are those who suffer worst and most frequently from the eruption. There are several probable reasons for this. I was told by the superintendent that new men were generally set to work here first. The work consists in the carriage of the paraffin, which is about the consistency of stiff vaseline, from the receptacles where it has been cooled, to presses into which it is shovelled, and there squeezed to remove the oil.

The presses are arranged like cider-mill presses, and the packing involves much handling of the substance. The men were all working with their sleeves above the elbow, their trousers tightly tied below the knee, and loose gaiters of cloth or bagging strapped about the calf. The warm room was cleaner and much better ventilated, and although the process is similar, there is less direct contact with the wax.

In these two rooms I saw a number of cases. I shall only go into the details of one or two. It appears from the testimony of the workmen, as well as from that of the superintendent, that, while most men are afflicted in from three to six weeks after going to work, some men never suffer at all. I saw one laborer who had been six years in this department, and never had had any trouble; but except the one already described, the worst eruption which I studied was in an Austrian workman who had been six

months in the paraffin rooms before he had any trouble. Two months after the eruption appeared, slight improvement began, and it was just at this time that I saw him. In him the boils were chiefly on the arms and shoulders. The legs were less affected. I examined the urine of this patient very carefully, but could find nothing abnormal. In studying his blood, I did discover a curious but isolated fact. There was a distinct difference in the sizes and shapes of the corpuscles. The red corpuscles were cup-shaped, balloon-shaped, ovoid or crenated, and the sizes varied a good deal.

In three examinations of this man's blood I noticed this condition of poikilocytosis growing less in each. In the last examination the blood seemed to have returned to a natural state. The blood was studied within a minute of its withdrawal, so as to be sure of its freshness. The patient's general health was excellent.

In one case, in which the skin lesions were few, I found what I took to be fat crystals in the pus removed from a boil, and these were present in all of several slides made from it. I studied the blood, pus and urine in several other cases without noting anything unusual.

Anatomically, it is interesting to observe the situation of the boils. I believe that every one of them began in a hair-follicle, or at least this was true of every one of which I was able to note the commencement. About this seat the inflammation centred. If the hair-follicles and the sweat-glands be as intimately connected as is sometimes asserted,

this could hardly be otherwise. Again, it is at least curious that in no case were any boils observed upon the head, though, of course, this situation is usually well protected by a hat from contact with the oil; still, if it penetrates through several thicknesses of clothing to the limbs, why should it not make its way past so slight a barrier as a light cloth or straw hat?

To these details is to be added the fact that the general health of the workmen in paraffin seemed to be very good; those who had never had the eruption and those who had convalesced from it had clean skins and every sign of good condition.

Men suffering from the boils appear not to be affected beyond the local irritation unless it grows very severe. The paraffin seems to have no other than a local action; new men are attacked, as I have said, usually within a few weeks, sometimes not for months. In ordinary cases the irritated regions are the flexor surfaces of the arms, the front of the belly above the waist and the thighs; rarely the lower leg. The Superintendent of the Atlantic Company told me that his long experience in the oil regions and in Philadelphia had made him sure that friction was a factor. With this I incline to agree. The rolled sleeve rubs into the hollow of the elbow and below it, and here are the most spots on the arms. The trousers are strapped about the waist, and in several men I found a row or two of pimples and comedones extending around the body at this height when the abdomen was otherwise clear. The trousers' legs are fastened below the knee, and this makes them rub the knee and draw tight over the

thigh. The clothes, of course, are soaked with the oil, and it is rubbed persistently into the skin by the friction of the moving garments.

I am a little at a loss to account for the cold-room men suffering more than those in the warm room. The latter are rather less in actual contact with the oil, and perhaps the warmth of the room renders the oil more fluid, and promotes a sweat-secretion which helps to carry it off. New men require some suffering to teach them the necessity of washing both themselves and their working clothes, and it is in the cold-room, as above mentioned, that new men commonly begin.

The workers in benzene suffer, I am told, in a similar way, but I have not been able to see any cases; and in the oil regions, pump-men, who are liable to be splashed by the crude oil, have the eruption badly; but here the crude oil is handled entirely by pipe-lines, so that the laborers have no direct contact with it.

I have not seen or heard of any cases such as Joseph Bell describes, in which paraffin had caused an epithelioma of the scrotum (*Edinburgh Medical Journal*, xxii. part i. p. 135).

I believe the only case hitherto reported in this country is one described in a brief note by Professor Harrison Allen in the *American Journal of the Medical Sciences* (1882, N. S., xliii. p. 92), in which kerosene oil was the cause.

I have recommended to the Superintendent of the Refining Company, who requested me to suggest a method of prophylaxis, that he should try to get the

men to use a weak soda solution for their washing after work.

NOTE.—No reference has been made in this article to a very interesting paper by Dr. L. Lewin, “Ueber allgemeine und Hautvergiftung durch Petroleum,” in *Virchow's Archiv*, cxii. H. 1. Dr. Lewin studied several of his cases at the Atlantic Oil Refinery, and gives an excellent lithograph of the lesions in one. The present paper, however, was completed before the appearance of Dr. Lewin's, and I have left it as originally written.

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Anterior Aspect of Left Forearm + Elbow.

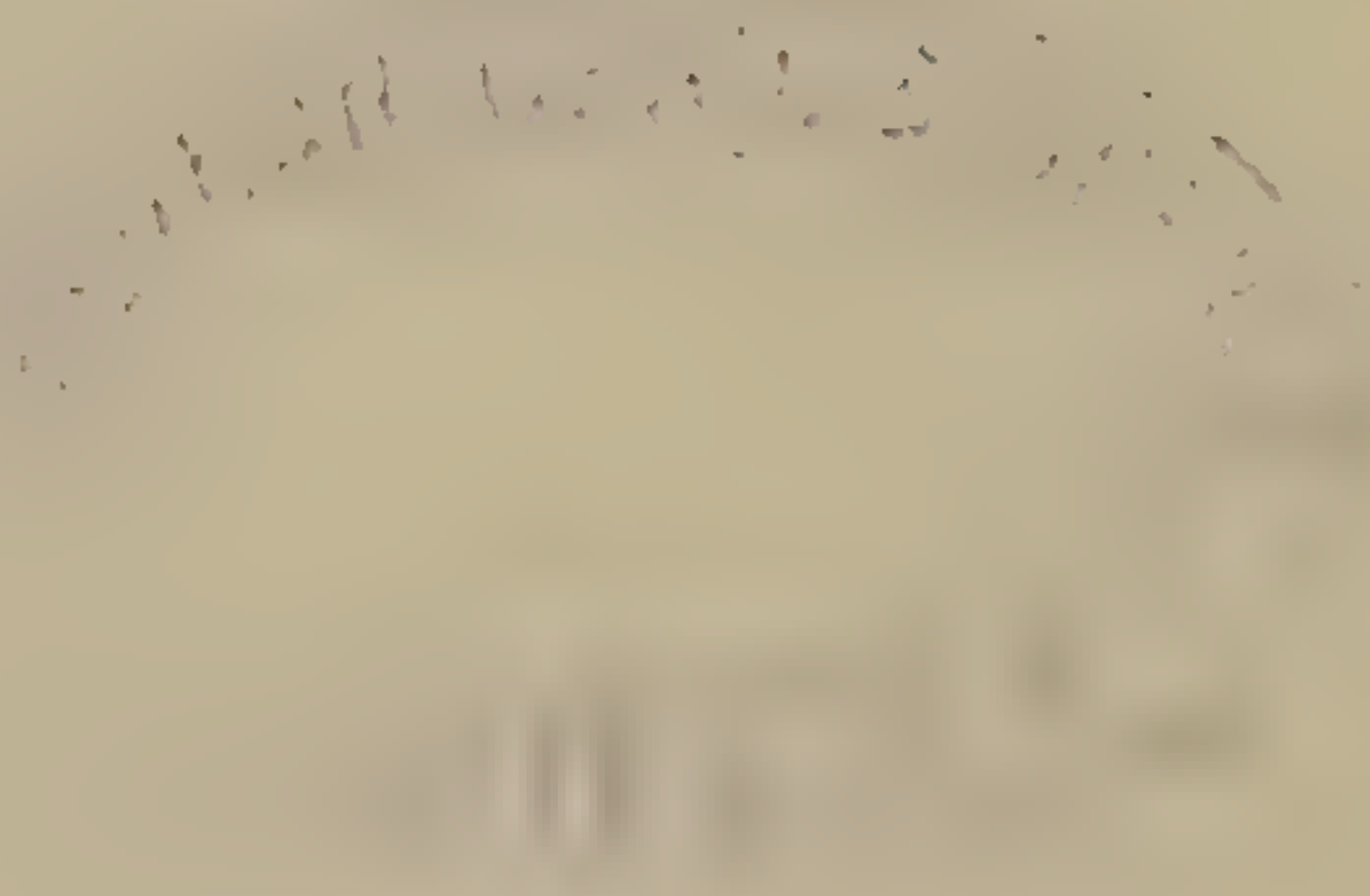




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Anterior aspect, left fore-arm

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Right Arm -



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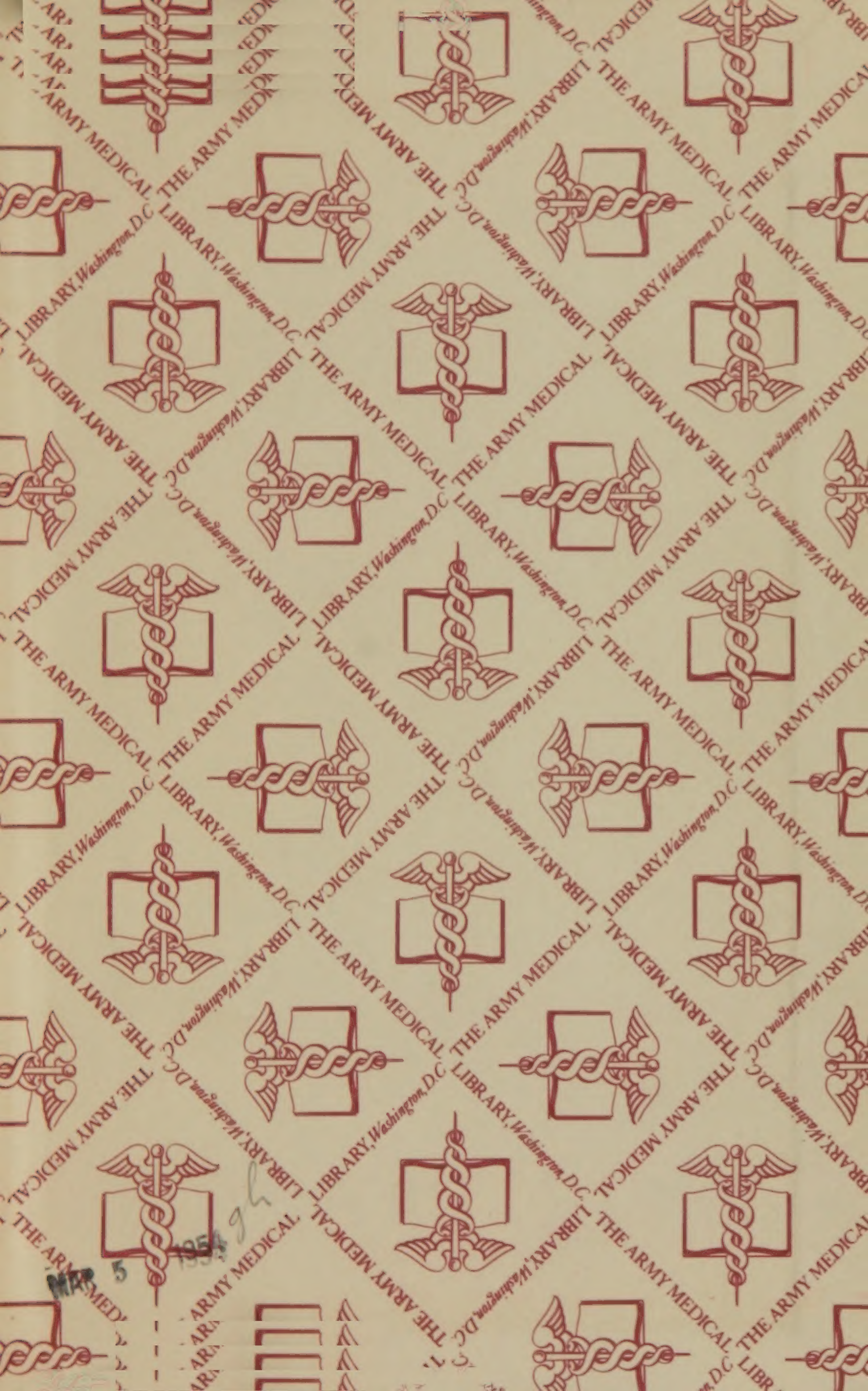
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Lateral & anterior view -

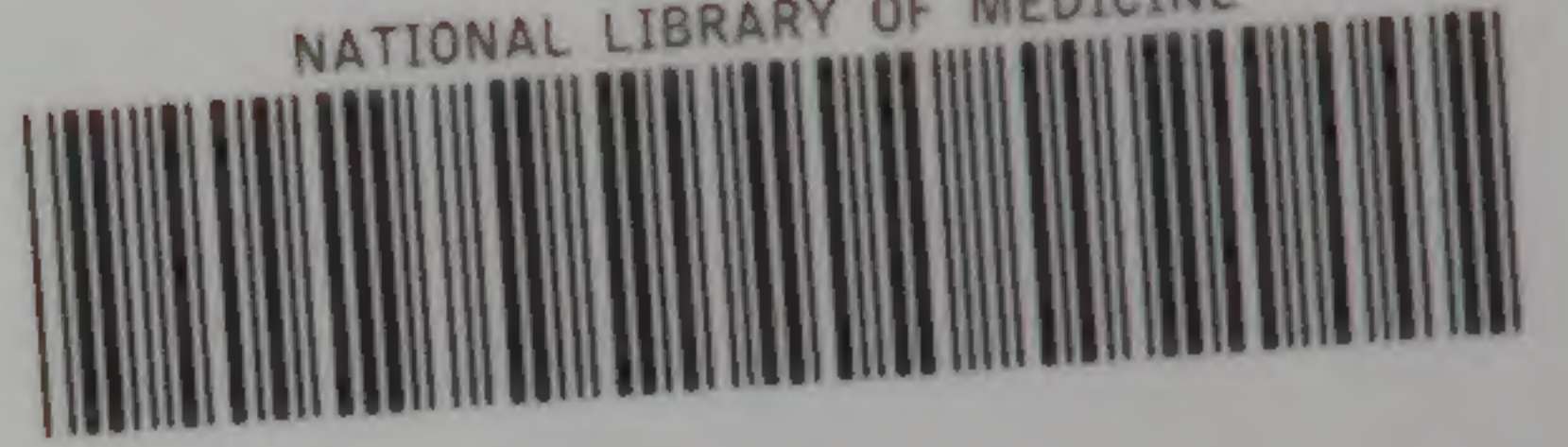
Left forearm & elbow -

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